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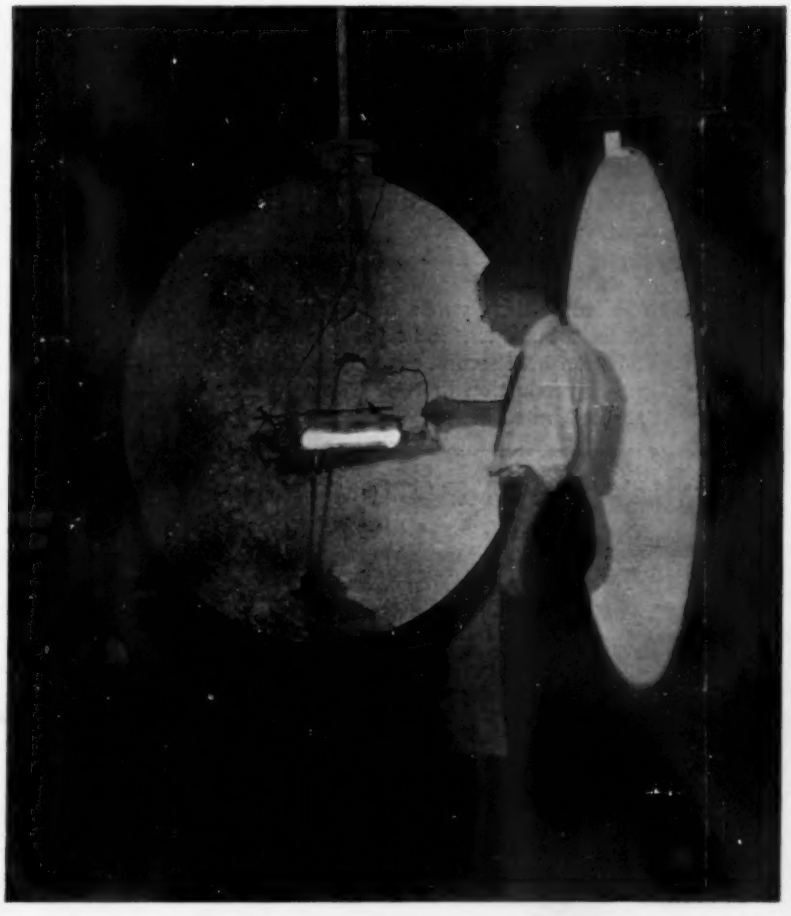
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



FEBRUARY 11, 1933

Light of Future?

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SCIENCE NEWS LETTER

VOL. XXIII *No. 618*

The Weekly Summary of Current Science

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SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

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DO YOU KNOW?

A French chemist has reported a process of removing shine and restoring the nap of worn garments.

Colorado leads the States in production of sugar beets, producing more than twice as many as California, its nearest competitor.

According to available records, the first collection of big game trophies from America was made by Queen Elizabeth of England.

The little village of Leticia, over which Brazil and Colombia have been disputing, is a "seaport" town on the Amazon River, almost 2,000 miles from the sea.

Many years before discovery of liver treatment for anemia, natives of Ceylon used liver to treat sprue, a tropical disease closely resembling pernicious anemia.

Statistics compiled by the German Institute of Economic Statistics, indicate that the Soviet Union held second place in world industrial production in 1932, ranking next to the United States.

The metal tantalum got its name because isolating it was so difficult.

More bird life can be seen in the Everglades region of Florida than any where else in the United States today.

The Field Museum finds that while its pay visitors decreased last year, the total number of persons using the museum increased.

A "zig-zag" steel grating road, inexpensive to produce and needing no maintenance for twenty years, is reported perfected in Austria.

The little ruby-throated humming bird will attack and generally drive off a much larger bird, such as a crow or even an eagle, that endangers its nest.

French archaeologists plan to send divers into the Rhone River to seek two boats which sank in the sixteenth century, carrying down many Roman antiques.

Near Juneau, Alaska, gold dust is known to exist at the bottom of Stephens Passage at a depth of some 600 feet, but so far no machine has been devised for dredging it.

WITH THE SCIENCES THIS WEEK

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ANTHROPOLOGY
How many Palestine skeletons with receeding jaws were found? p. 92.

ARCHAEOLOGY
How did New Stone Age people live in the present Jugoslavia? p. 89.

How far back may the historical period of China be traced? p. 90.

Who were eponyms? p. 83. *Mesopotamian Origins—Ephraim A. Speiser—Univ. of Penna.*, 1930, $3.

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MEDICINE
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What is a "low" to the meteorologist? p. 88.

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PSYCHOLOGY
Is it possible for a person to taste a sound? p. 86. *The Science of Psychology—Raymond H. Wheeler—Crowell*, 1929, $3.75.

RADIO
Why has radio communication across the Pacific been difficult? p. 88.

These curiosity-arousing questions will be especially valuable to the teacher. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publishers' prices, prepaid in U. S.

AGRICULTURE

Yellow "White" Potato Made To Order Through Research

Small South American Tuber of Low Yield Has Become 500-Bushel-Per-Acre Potato Containing Vitamin A

NOW THAT the matter of producing sufficient food for the population is no longer a problem, the question of developing new food products to suit more closely the needs and tastes of consumers is receiving the attention of progressive farmers.

Uncle Sam, through the cooperative activities of the Bureau of Home Economics and other bureaus of the U. S. Department of Agriculture, aids in this new sort of consumer's research. The method he uses is described by the Secretary of Agriculture, Arthur M. Hyde, in the current issue of the *Journal of Home Economics*.

"In South America some time ago plant explorers of the Department of Agriculture discovered a new variety of potato," said Secretary Hyde. "It was no ordinary, corner-grocer store potato. It was yellow of flesh, yet was not a sweet potato. Except for that yellow flesh, it looked and tasted pretty much like our staple Irish potato.

"A yellow 'white potato' so to speak, aroused the curiosity of our nutrition experts. They wondered whether the yellow color indicated the presence of vitamin A. If it did, then the humble potato would make still another contribution to good nutrition and the problem of the low-cost diet would be that much easier to solve.

"The scientists satisfied their curiosity by establishing the fact that the yellow flesh of this new potato did in fact signify the presence of vitamin A. That was good news, but it was only the first step. Would this South American potato yield well in North America? Would it be resistant to disease? Would it have the qualities that attract consumers?

Crossed in America

"The newly discovered potato from South America thus became one in a series of investigations. The plant breeders crossed the newcomer with American varieties to create a potato that would rival our popular varieties in yield and marketability and still retain that precious vitamin A."

Next will come tests in the laboratory to find out whether it meets the housewife's and the professional chef's requirements in the matter of cooking, keeping, and palatability.

"Here we have a complete case history of a farm product," Secretary Hyde said. "We can determine what variety, what environment, and what cultural practice will produce the most marketable potato. We can devise fairly specific standards—not only for size, but for flavor, mealiness, and other cooking qualities—and actually control our production to achieve those standards."

Egg or Butter Potato

The yellow potato referred to by Secretary Hyde is one which has appealed to all plant explorers who have visited the South American home of the potato. It was first brought to the United States for the Department of Agriculture in 1899 by David Fairchild, who was then making his maiden voyage as an explorer. This importation was the first potato b ought in for the new Division of Foreign Plant Introduction of the U. S. Department of Agriculture during the first year it existed as an independent office.

It has always been highly prized by the people of Peru, Bolivia, and Chile for its delicious flavor and bright yellow color. They call it the egg potato or butter potato. The chief drawbacks of the variety are that it has a very low yield, no matter what the conditions under which it is grown, and it has very deep-set eyes with prominent "eyebrows."

The new hybrid, developed by Dr. C. F. Clark of the Bureau of Plant Industry, has a smooth skin, good flavor, cream color, and an abundance of vitamin A. It has given the extraordinarily good yield of 500 bushels an acre on an experimental farm in Maine.

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EVOLUTION OF A POTATO

The yellow "white" potato as grown on the ancient terrace farms of Peru, and as grown by scientists of the U. S. Department of Agriculture. On the left is a primitive variety of yellow potato with irregular shape, deep-set eyes, and overhanging "eyebrows." On the right is the new hybrid developed by Dr. C. F. Clark, of the Bureau of Plant Industry. The flesh of the hybrid is a cream yellow in color which adds a decorative note to the table as well as supplying the precious vitamin A.

ARCHAEOLOGY

Three Centuries Added To Assyrian History

LITTLE clay tablets unearthed at Tell Billa in Mesopotamia have added three hundred years to the history of ancient Assyria. This discovery has just been announced by the University of Pennsylvania Museum whose expedition, working jointly with the American Schools of Oriental Research, unearthed the important documents.

The tablets reveal that the old Assyrian system of naming each year in honor of an official was practised as early as 1300 B.C. These officials, known as eponyms, held office for a single year. The long lists of eponyms therefore provide historians with a com-

plete Assyrian chronology, which has heretofore been carried back only to 963 B.C. These Assyrian name-years form the main basis for fixed dates in early Bible history.

All the cuneiform tablets found at Tell Billa are dated to the earlier eponyms, including King Shalmaneser the First, who reigned in the first quarter of the thirteenth century B.C.

The clay tablets were discovered last year under leadership of Dr. E. A. Speiser. They were so poorly preserved that at first he could decipher just enough to convince him of their importance. For eight months the tablets were set aside to dry, and then were sent to Dr. Edward Chiera of the Oriental Institute of the University of Chicago, who treated them by special processes so that they could be more clearly read. His reading now confirms and amplifies Dr. Speiser's brief examination.

Name Found

It is also announced that the Tell Billa expedition has discovered the ancient name of the city being unearthed. A bronze bowl bearing the name Shibaniba has been found. The expedition had thought this might prove to be the name of the city, for one of the gates of Nineveh, fifteen miles away, was called the Shibaniba gate. The gate faced north and opened directly to the road toward Tell Billa.

By identifying the ruins as Shibaniba, an important Assyrian province is added to the definitely known section of the old Assyrian Empire.

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RADIO

The Science Service radio address next week will be on the subject

TRANSPLANTING YOUR MIND

by

Dr. A. T. Poffenberger

Chairman of the Division of Anthropology and Psychology of the National Research Council and Professor of Psychology at Columbia University

FRIDAY, FEB. 17

at 1:15 P. M. Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

PHYSIOLOGY

Electrical Control of Cancer Suggested by Yale Professor

A METHOD for the control of cancerous growth, based on the knowledge of the electrical currents present in all living tissue, is suggested by Dr. Raymond Dodge, professor of psychology and a member of the Institute of Human Relations at Yale University, in the *Yale Journal of Biology and Medicine*. Experimental work thus far, Dr. Dodge says, supports his presumptions, which are published, he adds, so that investigators in the field of cancer research may substantiate or destroy his hypothesis.

This method of cancer control is still in the laboratory stage and has not reached the point where it can be used on actual cancer patients. Consequently do not let anyone sell you or your relatives an electrical cancer cure or diagnosis on the strength of Dr. Dodge's announcement. It will be years, probably, before any practical application of his theory can be made.

Current From Tissue

It is well known that any living tissue is internally electrically positive with reference to its surroundings, giving rise to a detectable negative current of action, Dr. Dodge says. When a direct current comes in contact with a tissue, he explains, there is a decrease in the metabolic activity at the positive, or anode end, causing death of the tissue if the current is of sufficient intensity.

"The obvious bearings of these facts on the study of cancer are three," Dr. Dodge says. "The negative current of action should provide a precise measure of the activity of the cancerous tissue. If, and when, any treatment is adequate to delay the growth, the negative current of action should be decreased or be reversed. If the growth is actually being decomposed by any necrotizing therapeutics the negative current of action should be transformed into a positive current. So far as I know, this should be the most precise and most reliable indication of the cancerous activity and its control. An appropriate electrical exploration of the regions should enable the experimenter to determine the margins of the growth and hypermetabolic activity by the points at which the negative current of action ceases."

The fast rate of growth of cancerous tissue, producing a powerful positive charge giving rise to a strong negative current, depresses the metabolic activity of the surrounding cells, and actually kills them, a characteristic of all serious cancerous growths, Dr. Dodge says, in describing the electrical picture presented in cancer.

Electrical Control of Growth

"This gradient of electrical charge with corresponding currents gives the hint of an experimental attack on the treatment of cancer by the reversal of pathological currents. If a direct current is applied so that a positive superficial charge is superposed on the active area it should develop an anode block, producing depression of the metabolic activity or death of the cells within the area to which the current is applied, according to the amount and the direction of the current.

"If a corresponding positive charge is superposed on the immediate surroundings of the cancerous growth the disease gradient should be reversed and the normal activity of the surrounding tissue might be expected to be reinstated. The desired results and the magnitude of current employed might be kept under constant empirical control by the measurement of the metabolic activity of the cancerous region through its negative current of action. It should thus be possible at will merely to retard growth, to stop growth, or to produce necrosis of the growth, as circumstances seem desirable."

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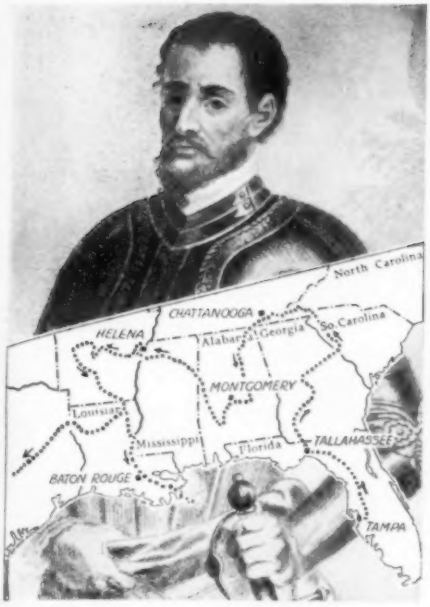
HISTORY-ARCHAEOLOGY

De Soto's Famous Route To Mississippi Traced

PICKING up a cold track, almost 400 years old, science has traced with remarkable success the wanderings of that romantic Spanish adventurer Hernando De Soto.

Your school-book history doubtless showed a rough sketch of the Spanish leader's wanderings. Thirst for gold



AS DE SOTO TRAVELED

Superimposed over a likeness of the famous Spanish explorer is a map showing his route through the Southeast as reconstructed from the latest evidence.

and Indian treasures, such as Peru had yielded, led De Soto on a wild goose chase over the entire Southeast. All he won was the fame of discovering the Mississippi River. Recently, science has been mapping precisely the famous expedition, identifying modern towns and landmarks with the Indian names and places that De Soto encountered.

Dr. John R. Swanton of the Bureau of American Ethnology has produced a map of the journey which he calls, in jest, the 1933 model. Next year, he says, there may be improvements, slight shifts of the line here and there as new information is gained. Dr. Swanton, noted authority on Indians of Southeastern States, said that his interest in the De Soto route was aroused by Col. John R. Fordyce of the Arkansas Historical Commission. Col. Fordyce has paced out De Soto's route in some sections, figuring the distance the Spaniards would travel each day and checking his computations by landmarks or Indian sites.

De Soto landed near Tampa, in 1539. Two years later, he reached the Mississippi and, crossing over, wandered still farther west. In 1542, when he and his band were returning down the Mississippi River, De Soto died and his body was lowered into the great river he had discovered. His followers later attempted to strike out west for Mexico City, but the venture failed.

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GEOLOGY

Unevenly Distributed Minerals Said to Threaten World Peace

Japan and Italy Present Problem in Lack of Minerals; British Empire and United States Best Supplied

UNEVEN distribution of minerals essential to modern civilization threatens the peace of the world, Prof. Richard M. Field, Princeton geologist, warned in a Science Service radio talk over the Columbia Broadcasting System. Until the geographical location of important metals, coal, oil, nitrates, phosphates and potash is seriously considered from an international point of view, Prof. Field predicted, there never can be a reasonable amity among nations, no matter what other factors may affect international affairs.

U. S. Government statistics show that 28 minerals constitute more than 70 per cent. of the gross value of the mineral raw materials of commerce. English speaking people in the United States and the British Empire have, Prof. Field said, "by one means or another gradually acquired the absolute or partial control of two-thirds of the essential mineral resources of the world."

The Japanese situation is the present outstanding problem in mineral resources, Prof. Field said. Japan has barely enough copper and zinc for domestic consumption, with an inadequate supply of iron, chromite and manganese. She is entirely dependent on other nations for all other mineral supplies, except for coal and petroleum, which she controls through mandates.

Italy, another first class power, is in about the same position as Japan, except that she has no control over petroleum and coal and is a little better off as to iron and lead. Both Japan and Italy are in a worse position than England would be if she were divorced from the British Empire.

Possible Trouble in Spain

Spain is described by Prof. Field as "a nation that is not making the most of her natural resources." This country, he predicted, may become a source of trouble in the international affairs of Europe. With the exception of certain ferro-alloys and petroleum, Spain has adequate deposits of the important minerals and an excess of copper, iron, lead, manganese and mercury for export.

Germany has inadequate supplies of metallic minerals but excesses of coal, nitrates and potash. France is only a little better off than Germany, Prof. Field said, with more aluminum and iron than she needs but no petroleum.

"In normal business times the United States has all the minerals which she needs within her own sovereign territory, with the exception of tin, platinum and some of the alloy metals and nitrates," he stated. "It is perhaps news to some that, in spite of the fact that the United States produces nearly 71 per cent. of the world's petroleum, in good business times she consumes nearly this amount. The only net excess of raw mineral commodities which the United States has for export are copper, coal, phosphates, and sulphur.

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BACTERIOLOGY

Germs Not Killed By Liquid Helium

EXTREMELY low temperatures, approaching those believed to exist in interstellar space, failed to kill bacteria in tests at the University of Toronto. Germs frozen for weeks in liquid helium, at a temperature of about 450 degrees below zero Fahrenheit, proved to be alive and able to multiply as though nothing had happened to them, as soon as they were thawed out.

These results are taken as indicating at least the possibility of the lower forms of life migrating through space, perhaps attached to bits of dust. They are of more immediate practical value as demonstrations of the fact that though cold will preserve foodstuffs it will not kill the germs of decay that lurk on them.

The experiments were performed by Dr. J. O. Wilhelm, physicist, Dr. H. Wastenays, biochemist, and Dr. W. L. Holman, bacteriologist.

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PSYCHOLOGY

Your Ears and Nose Help You to See

Scientific Tests Show That a Whiff of Citronella, Or the Sound of a Whistle, Makes the Sight Keener

By MARJORIE VAN DE WATER

DO YOU READ these words with your eyes alone, or do your ears, your nose, your tongue, and the senses of your skin all lend their aid?

Of course, you cannot taste a newspaper or a book except in a figurative sense, but what you do taste may give a different appearance as well as flavor to the page before you.

All of which is a rather complicated way of saying that there may be a great deal more cooperation between the different senses than has been realized in the past. This fact has been revealed by recent experiments conducted in Berlin by an American psychologist Dr. George W. Hartmann, of Pennsylvania State College.

Now it appears that there may be good scientific foundation for the old custom of pinching oneself to make sure of the reality of what is seen. Perhaps too, the stenographer who chews gum is really aided by it in her effort to hear her employer's dictation.

The beautiful play of colors which accompanies orchestral selections in many theaters may not only delight the eye, but also make the music sound more lovely. And the bright color of the rose may intensify your pleasure in its scent.

Not that Dr. Hartmann's experiments were conducted in the theater or the garden. On the contrary, it was in a quiet laboratory darkroom that he found that some sort of connection exists between the senses.

A whiff of odor from a bottle of that mosquito chaser, oil of citronella, will make your sight keener, he found. So also will the very disagreeable odor of xylenol which smells rather like coal tar or strong disinfectant. And the sound of a whistle, the pressure of a hammer against your hand, or the pain of a pin prick.

You may or may not be aware that your sight is improved by these signals to your other senses. Some of those who took part in the experiment were conscious of the improvement; others complained that the "distractions" or annoyances kept them from doing their best. But the test results told the same story of greater keenness of vision, quite regardless of what the individual thought he was accomplishing.

The test consisted of two little black squares placed in the center of a white cardboard. These squares could be manipulated from where the experimenter sat, out of sight of the subject behind the cardboard. They could be placed so close together that at the distance of about twenty feet away, the subject being tested could not even see the crack between them. They would look like one rectangle. Then the experimenter would move them apart, very, very gradually until they appeared as two distinct squares to the subject. The smallest crack which makes them seen as two, not one, was considered as the measure of the keenness of sight.

When this amount, which psychologists call the "threshold," was definitely established under "normal" conditions, then the sounds and smells, and so on, were brought into the picture. First a shrill, high-pitched whistle was blown while the person tested was trying to decide at what point the squares seemed to separate.

Sees Better During Blast

Now a strange thing happened. Where the subject had been able to see only an apparently undivided rectangle, the blast of the whistle made him see two distinct squares.

"The tone jarred the two squares apart so that a better defined crevice appeared in the center," one man reported.

Another observer said that after the whistle ceased, the split between the squares also vanished. Some said that they felt more tense during the time the whistle was blowing. One claimed that his concentration was better during the time the shriek was in his ear, but another insisted that he worked better without the "distraction." The scale which showed the actual distance detected, however, uninfluenced as it was by the unpleasantness of the sound, showed that the sound was not a hindrance but an aid to the vision. And this despite the opinion of the observer.

COOPERATING SENSES

When an odor sends its signal to the olfactory center of the brain, or a noise to the auditory center, your vision is improved. Dr. Hartmann believes this is due to a transfer of energy between the centers.

Perhaps you would like to try the experiment yourself. It may not be possible for you to secure the use of darkroom and the apparatus for adjusting the distance between the squares, but still you can get a rough idea of what the experience is like by pasting up a series of squares various distances apart. Use black paper—the construction paper used by school children in the lower grades is very good for the purpose—cut squares three centimeters on each side (1 3/16 inches), and paste these on white paper. Better have one pair about an eighth of an inch apart, the next a little closer, and so on until your last pair are touching.

Now set the squares upon some sort of rack about twenty feet away from your eyes. You should look at them through one eye. And the observers in the original experiment also took the precaution of looking through a pinhole so that the dilation of the pupil of

the eye would not make the test easier for some individuals.

What do you see? Probably some are quite distinctly two squares. Others look exactly as though they had magically run together. But another group probably are not clearly either two or one. They may appear fuzzy down the middle, or they may be uncertain—now two, now one. It is in this latter group that you are most likely to notice a difference when you hear the high-pitched sound, or smell the "loud" smell.

And here is another even more interesting experiment that you can easily try out in your own living room:

The materials you need are only a bright colored piece of paper—very bright green is probably best—a sheet of neutral gray paper and a tuning fork.

First stare at the bright spot of paper without moving your eyes for about a minute. Gradually you will notice that the edges become fuzzy and have a sort of pinkish halo—that is, it will be pinkish if your paper is green. If you chose a red patch, the color around the edge will be green. But keep looking until the minute is up. Then slip the gray sheet over the green and look at it steadily for a moment.

What do you see now? If you have not tried this stunt before you may be surprised at how bright and real the red patch is. Wait until it just begins to fade and then set the tuning fork to vibrating and bring it close to your ear. You will probably find that the image brightens perceptibly. Now move the fork away, and see what happens.

Many who tried it, found that unaccountably when the fork was moved out of hearing the image vanished with it. Sometimes bringing the fork back will restore the image; sometimes it is gone for good.

For a few, the fork did not seem to brighten the image but caused it to wave or flicker in tune with the vibrations of the fork.

The amount of improvement in vision brought about by the sounds and smells and hammer blows is, of course, very slight. It is, however, sufficiently consistent to point definitely to one fact —there is apparently some connection between the senses.

"Apparently, lights, sounds, smells, pressures, and pains do have some property or properties in common, for how otherwise would one account for their similar influence upon visual acuity?" Dr. Hartmann said.

Sounds Having Color

And there is an exchange of energy between the different centers of the brain, Dr. Hartmann is convinced as a result of his experiments. The activity of any one sense organ does not remain confined in that organ, he says, but spreads, although in lesser degree over all the other sense centers.

It is not that your eyes respond to sound waves, or to odors. But when your ear receives the sound and transmits it to the auditory centers of the brain, its duty is not yet done. The nervous impulses which carry the sound also excite other centers of the brain. When the visual centers receive these impulses, they are interpreted by you as coming by way of the eye—what you see seems brighter, sharper, clearer.

In some individuals, the senses are very intimately related so that sounds to them have color, or even taste.

Sir Francis Galton, noted anthropologist who was largely responsible for our system of using fingerprints to detect and identify criminals, was one of these persons. To him, many sounds had definite colors.

"The vowels of the English language always appear to me, when I think of them, as possessing certain color," he said. "Consonants, when thought of by themselves, are of a purplish black; but when I think of a whole word, the colour of the consonants tends towards the color of the vowels. For example, in the word 'Tuesday,' when I think of each letter separately, the consonants are a purplish-black, u is a light dove color, e is a pale emerald green, and a is yellow; but when I think of the whole word together, the first part is a light gray-green, and the latter part yellow. Each word is a distinct whole."

A new school of German psychologists, called the Gestalt school from the German word which means pattern, teaches that an individual does not have single experiences or sensations by themselves. You respond not to red or yellow or tree or cloud, each by itself, but rather to the whole environment as a pattern.

His experiments, Dr. Hartmann believes, add new evidence to the argument of this school. Not only do you see what lies before your eyes as one great pattern, but woven into the design are also the myriad sounds which assail your ears, the perfumes which reach your nose, and the pressures and pains which make the scene smooth and soft or harsh and grating.

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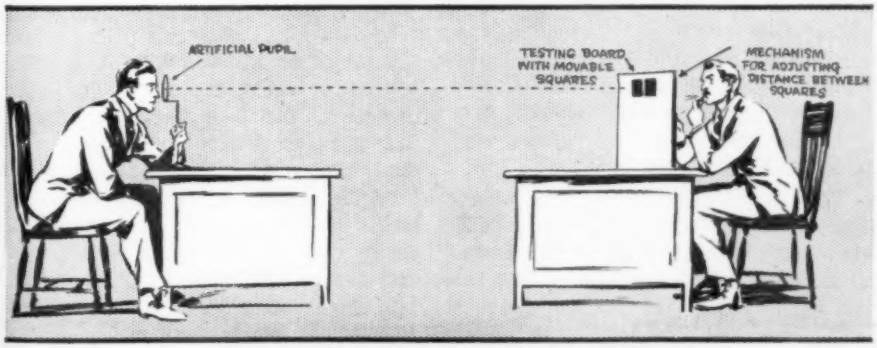


IN THE MIDST OF AN EXPERIMENT

The man at the left, looking through an "artificial pupil," a pinhole in a cardboard, keeps his vision on the two black squares manipulated by the man at the right.

METEOROLOGY

Midwinter Rainbow Seen Due North

UNUSUAL among meteorological phenomena, a rainbow in the northern sky was observed by Prof. Edwin L. Moseley of Bowling Green State College, Ohio.

Rainbows are seen when the sun, usually low in the sky, shines upon a curtain of raindrops opposite it in the heavens, the drops returning the split-up light to the eye of the observer by a double internal reflection. In summer the noonday sun often shines upon rain in the northern sky, but it is too high to form a rainbow. In winter the noon sun is low enough to form a bow, but if there is any water in the air it is frozen and hence unable to reflect the light properly and to break it up into the rainbow colors. It is only when a very mild winter brings rain when the sun is low enough that this unusual sight of a north-sky rainbow can be seen.

Science News Letter, February 11, 1933

METEOROLOGY

Storms Write Record On Map and Seismograph

THE TERRIFIC storms that have recently been lashing the Atlantic coast have been writing their signatures large on the weather map, recent Weather Bureau studies show. Three successive areas of abnormally low pressure, entering the country over Puget Sound, have marched southeastwardly as far as Kansas and then swung straight eastward, running across country and out to sea just south of the Mason-Dixon line.

The wind-pulling low barometric pressures in these "lows" have been comparable with those of summer storm areas, and well below the ordinary winter "lows." Their extent has been extraordinary, blanketing half the country.

Attributable to the unusual storm phenomena have been an unusual series of microseisms, or tiny tremblings of the earth that register themselves on the sensitive seismographs of earthquake observatories. Rev. John P. Delaney, head of the physics department at Canisius College, Buffalo, N. Y., has just reported to Science Service a veritable storm of microseisms that coincided with the storm in the air.

Science News Letter, February 11, 1933

METALLURGY

Aluminum to Carry on After Iron is Exhausted

THE EXHAUSTION of iron and steel of the present age of metals forebodes no evil for civilizations to come, in the picture of the future given to the American Institute of Electrical Engineers by Prof. Colin G. Fink of Columbia University, inventor and authority on electrochemistry.

For the next age will be that of aluminum, Prof. Fink predicted. And aluminum is the most abundant common metal in the earth's crust, being even more common than much-used iron, which it is expected to supplant for many purposes.

"The keynote of the coming new era will be the large number of new products and devices," Prof. Fink declared. "Among the metals the one metal to enter the widest variety of new fields will be aluminum—aluminum for railway equipment, aluminum for roofs and buildings, for food containers, for transmission, for airplanes, for tank cars, pipe lines, fencing, etc. Finally we should mention the new aluminum plate, superior to tin plate in many respects, developed at the electro-chemical laboratories at Columbia. . . .

"Whereas the supply of raw material for many of our metals is comparatively limited in years, the supply of bauxite or aluminum ore is almost limitless. Thus, for example, whereas copper at the 1929 rate of consumption will last but forty or fifty years, the aluminum ore reserves will satisfy our demands for many hundred years."

In the relative abundance of the common metals in the earth's crust, taking the parts by weight, aluminum leads with 80,000, iron is second with 50,000, while copper is seventh with only twenty, Prof. Fink pointed out. He said that for every pound of copper in the earth's crust there are 4,000 pounds of aluminum.

Science News Letter, February 11, 1933

PHYSICS

Tuning in on Atomic Hearts Makes Their Breaking Easier

BY ALLOWING the heart of a helium atom to "tune in" on the heart of an aluminum atom, creating in it a sympathetic vibration, physicists of the Carnegie Institution's department of terrestrial magnetism at Washington have smashed the aluminum heart or nucleus. This achievement by Dr. L. R. Hafstad was announced by Dr. M. A. Tuve in a lecture before the Franklin Institute of Philadelphia.

The first experiments on the resonance smashing or disintegration of atoms were performed by Dr. M. Pose in Germany and the Carnegie scientists have now confirmed this work and carried it further. It is found that when the attacking alpha particle or wave, which is the helium heart, has the proper energy it penetrates the other atom's nucleus. In this case, the alpha particles of mass four from radium joined with aluminum of mass 27 and formed silicon of mass 30 and released hydrogen of mass one in the form of a proton or wave-particle of positive electricity.

Using high voltage apparatus generating 600,000 volts, Drs. Tuve, Hafstad and O. Dahl repeated the experiments of Cockcroft and Walton at Cambridge, England. Hydrogen hearts or protons were flung at lithium and boron and helium obtained from the disintegration.

Science News Letter, February 11, 1933

IN SCIEN

RADIO

Magnetic Storms and Aurora Disturb Pacific Radio

CONDITIONS disturbing to radio over the Pacific have interfered with Navy and amateur radio communication somewhat during a large part of January. Auroral displays and magnetic storms may have been responsible, since cosmic data reports to Science Service from College, Alaska, and Tucson, Arizona, show such conditions frequent.

The Navy has had unusual conditions in radio on the Pacific coast. And radio amateurs who have been cooperating with the Department of Terrestrial Magnetism of the Carnegie Institution of Washington in communicating with its magnetic observatory at Watheroo, Western Australia, have been hampered. By Feb. 1 amateur communications had cleared sufficiently for effective traffic to be resumed.

The Carnegie scientists at Watheroo use their radio VK6MO to communicate with H. M. Cooper, station VK5HG at Glenelg, South Australia. This station relayed the messages half way around the world to W3QP manned by John D. Morgan II at Philadelphia or W2CC operated by Albert E. Scarlett at Mt. Vernon, N. Y. These two amateurs then send the messages on to Washington.

Science News Letter, February 11, 1933

ENGINEERING

Tallest Radio Tower 878 Feet High

SAID to be the tallest radio antenna in the world, the new radio tower of station WSM at Nashville, Tenn., rises 878 feet. It is a single structure of steel, resting at the base on a porcelain insulator. Eight steel wire guys, attached 370 feet from the ground, hold its 150 ton weight vertical. At the base and at the 758 foot level the tower is a few feet square while at the guying level it is 38 feet square. A tubular steel pole of 120 feet surmounts the structural steel portion.

Science News Letter, February 11, 1933

...EN FIELDS

ENTOMOLOGY

Colorado Potato Beetle Spreads Rapidly in France

COLORADO potato beetles, or "potato bugs" are spreading rapidly in France, where they gained an entry during the World War. They are now found over about a third of the country.

Recently a group of German entomologists visited infested potato-growing regions, in anticipation of an eventual invasion of Germany by this introduced pest.

Science News Letter, February 11, 1933

ARCHAEOLOGY

Jugoslavia Called Key To Balkan Archaeology

THERE ARE tremendous possibilities for scientific exploration and digging in Jugoslavia, which is the archaeological key region of the Balkans, Dr. Vladimir J. Fewkes of the Peabody Museum, reported to the American Anthropological Association.

Dr. Fewkes described the results of the American Archaeological Expedition to Jugoslavia which he led last season, and which was sponsored by the Peabody Museum and Fogg Art Museum of Harvard and the American School of Prehistoric Research.

The expedition succeeded in surveying almost 150 archaeological sites in Jugoslavia. Most of these were classical, Dr. Fewkes said, representing Greek, Macedonian, Roman, and Byzantine cultures. The expedition also gathered new ideas of how trade routes ran through this part of Europe, and along what avenue the ancient cultures spread.

At Starcevo, where discoveries were made last year, the expedition resumed its digging and found many objects showing what life was like along the River Danube in the Neolithic, or New Stone Age.

In this Stone Age village of about 2500 B.C. Dr. Fewkes reported finding foundations of semi-subterranean dwellings, arranged in irregular groups. The villagers had crude, but well-made pottery vessels for cooking, and beautiful colored vases and bowls. Among other articles in the ruins were needles, awls, and spatulas of bone; some knife blades and celts; shells; and small libation tables of baked clay.

The Stone Age people were simple farmers who also bred domestic animals and eked out the food supply by hunting and fishing. The layout of their community suggests to the archaeologists that these people had an organized social life. Religious thought is indicated by the libation tables and their burials accompanied by rites.

Science News Letter, February 11, 1933

PHYSIOLOGY

Blood-Forming Hormone Treats Variety of Diseases

A NUMBER of conditions besides pernicious anemia may be successfully treated with addisin, newly-discovered blood-forming hormone, Dr. Roger S. Morris of the University of Cincinnati reported to the American College of Physicians.

The normal stomach of man, swine, dogs or cattle secretes this blood-forming substance which Dr. Morris and his associates, Drs. Murray L. Rich, Leon Schiff, John H. Foulger and Henry Felson, believe is a hormone. They have previously reported that they were successful in treating pernicious anemia with this substance which after proper concentration and purification is injected into the muscles of the patient.

Another blood disease, erythremia, is in many ways the opposite of anemia, Dr. Morris pointed out. In erythremia there are too many instead of too few red blood cells. His studies suggested that in this condition too much of the blood-forming addisin is being secreted. He described the case of a patient suffering from both erythremia and stomach ulcer. To relieve the ulcer symptoms, he washed out his stomach three or four times a week for a six-months period. During this time there was a steady decrease in the number of red blood cells, just as might be expected from washing much of the blood-forming substance out of the stomach before it had a chance to function.

Possibility of curing a type of jaundice and a rather rare, fatal disease called Agranulocytic angina, in which there are too few white blood cells, is suggested by results of addisin treatment in a few cases, Dr. Morris said.

Science News Letter, February 11, 1933

MEDICINE

Success Reported With Whooping Cough Vaccine

WHOOPING cough vaccination has protected over 100 young children from the disease, Dr. Louis Sauer of Evanston, Ill., has just reported to the American Medical Association.

During the past four years about 300 children, not immune to the disease, were given injections of the vaccine. Of these, 127 were exposed to the disease without any child contracting it. Eight of the children were exposed to it in their own homes, when older brothers or sisters had the disease. Only one of these had any cough, and in this case the cough was slight, lasted only two weeks and there was no whooping.

A fresh supply of the vaccine was prepared every few months for the treatment by Dr. Sauer's collaborator, Leonora Hambrecht. The vaccine was made from a micro-organism known as *Hemophilus pertussis*, which is thought to be the germ causing whooping cough. Dr. Sauer emphasized that commercial whooping cough vaccines are not desirable and should not be used.

Science News Letter, February 11, 1933

PHYSICS

Huge Magnet to be Used In New Attack on Atom

THE NEW MOND Laboratory for atomic and low temperature research has just been opened at the University of Cambridge, England, with Stanley Baldwin, former prime minister, delivering the dedicatory address.

A vigorous attack on the atom will be launched in the laboratory under the direction of Prof. Peter Kapitza. The atom will be subjected to momentary magnetic fields approaching a million gauss. These are produced by one of the largest magnets in the world. This creates a pressure on the coil of two hundred atmospheres and causes local earth tremors that seem like earthquakes.

It is possible with the new apparatus to subject the atom to temperatures that are close to absolute zero.

Prof. Kapitza has invented a modification of the famous Dewar flask that keeps liquid hydrogen from evaporating for several days. The new flask is cooled with liquid air.

Science News Letter, February 11, 1933

CHEMISTRY

Research Stretches Rubber To New Uses as Textile

MEN'S SHIRTS that never lack their buttons because they have none, feminine corsets of different varieties and names that elastically fit the figure, varied colored "glasses" that bounce instead of breaking these are some of the new products that are about to come upon the market from American rubber factories that heretofore have specialized in auto tires, toy balloons and other familiar rubber articles.

Rubber is making a bid as a textile. In combination with cotton, rayon, etc., it is being used to make a stretchy new yarn. For garters and girdles it seems to be an ideal material. For shirts and shorts it is replacing buttons that give trouble on the person and in the laundry. Men may soon expect to be able to have shirts with elastic cuffs and a stretchy insert lengthwise so that they can get into them without buttons to fumble. "Lastex" is one trade name of one rubber-textile combination, elisions of "elastic" and "latex," the form in which rubber comes from the rubber tree.

Once hard rubber, "vulcanite" or "ebonite," made by mixing rubber with a little more sulfur than is used in the pliable sort of vulcanized rubber of tires, etc., was the principal synthetic material for combs, fountain pens, hairpins (when they wore them). Synthetic resins of the bakelite type usurped much of the hard rubber field and then they marched on to compete with glass and china ware.

Rubber is now invading this application also. A new plastic compound of rubber, tasteless and odorless, resistant to heat and scratching, classed as unbreakable, with lower costs claimed, is being offered. It will be made into dishes, household appliances and containers.

Science News Letter, February 11, 1933

ASTRONOMY-PHYSICS

Sensitive Instruments Extend Study of Distant Stars

ASTRONOMERS are enlarging their studies of the universe as the result of the more accurate and sensitive measuring of light from distant stars by two new methods.

One of these developments overcomes the limit set by the minute electric currents that flow through a wire even when no voltage is applied. These so-called Brownian fluctuations are very minute, but are nevertheless a nuisance in delicate electrical measurements. It was supposed that they set a limit beyond which no measurements could be pushed.

Nevertheless, Dr. Sinclair Smith of the Mt. Wilson Observatory, Pasadena, Calif., has devised a galvanometer for measuring currents a million times as small as the fluctuations. With the help of the photoelectric cell such an instrument can be used to measure the light that comes from stars thousands of times too faint to be seen with the unaided eye.

A fourteenth magnitude star, such as Dr. Smith measures in routine work, is so faint that the number of light quanta that arrive per second from it fluctuates in a random manner. This provides a limit to the sensitivity of any photoelectric device. To pass this limit one must work very slowly and take long time averages.

"Radio on Telescope"

What he describes as "a radio set on the end of a telescope" is now being used by Dr. Albert E. Whitford, at the Washburn Observatory of the University of Wisconsin, at Madison, to measure the brightness of stars. With a star of the ninth magnitude, considerably too faint to be seen with the naked eye, a variation in brightness of less than three hundredths of a magnitude can be detected, he says, in a report to the *Astrophysical Journal*.

This is much less variation than can be detected by the methods previously used, in which the minute current from a photoelectric cell, set up by the starlight falling on the cell, is detected by an electrometer. With this instrument, the speed of motion of a thin thread, as seen in a magnifying glass, is measured with a watch, and it is rather difficult to use. By amplifying the current from the photocell with radio vacuum tubes, the current can be measured directly on the scale of a galvanometer. The cell, as well as the vacuum tube, is enclosed within a vacuum, which, Dr. Whitford has found, makes the apparatus much more stable.

Science News Letter, February 11, 1933

ARCHAEOLOGY

China's Civilization Said To Be Only 4,000 Years Old

CHINA, the "mysteriously old," is not so very ancient in its civilization, after all, researches indicate.

China entered the Age of Bronze about 2000 B.C., is the conclusion of C. W. Bishop, archaeologist of the Freer Gallery of the Smithsonian Institution, Washington. Bronze Age China was, therefore, a contemporary with the Bronze Age of northern Europe, and younger than the earliest civilizations of Egypt and Mesopotamia.

Mr. Bishop arrived at his dating of Chinese civilization by calculating the lengths of the reigns of China's early rulers. The historical period in China goes back no farther than the ninth century B.C. But before that the Chinese people had kept careful account of their royal families' pedigrees. Century after century, they could trace the line of the raling princes.

To set approximate dates beside the list of early Chinese rulers, Mr. Bishop estimated the average length of a reign. The reign of a feudal prince in Europe was about 21 years, and this served as a guide, with some necessary modifications for Chinese dynasties that handed a throne on to the ruler's brother rather than his son. The yardstick of time that Mr. Bishop worked out, fitted very well with legendary dates, and also with what archaeology and climatology have indicated.

The computation of dates carries the Hsia dynasty, the first of "civilized China," back to about 1800 B.C.

Science News Letter, February 11, 1933

INVENTION

The Monotype

"A Classic Invention"

The Monotype is Operated by Perforated Paper Strips Like Those for Automatic Pianos and Jacquard Looms

MACHINE FOR MAKING JUSTIFIED LINES OF TYPE. Tolbert Lanston, of Washington, District of Columbia. Specification forming part of Letters Patent No. 557,994, dated April 7, 1896. [First Patent on the monotype No. 364,521, dated June 7, 1887.] This is an exact reprint of extracts from the 1896 patent.

To all whom it may concern:

BE IT KNOWN that I, TOLBERT LANSTON, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Machines for Making Justified Lines of Type; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

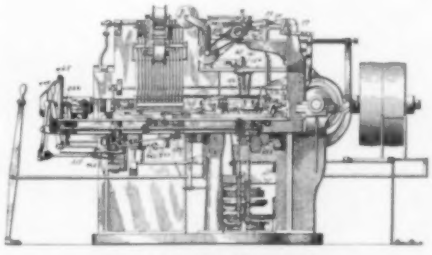
This invention relates to improvements in that class of machines for making justified lines of type in accordance with the methods covered by Letters Patent of the United States No. 364,521, granted to me June 7, 1887, and is designed particularly as an improvement upon the machine shown, described, and claimed in Letters Patent No. 364,525, granted to me on said above-mentioned date.

I will premise with a general description of the parts of the present machine and what they accomplish in order that the detail description which is to follow may be more readily understood.

In this machine, as in my former patented one, two perforated strips or ribbons of paper are employed for rendering the machine operative to form type. In one of these strips special perforations are made for operating upon the devices controlled by that particular ribbon to adjust the machine for the formation of types for any particular line in such manner as that the bodies of some or all of said type (and in this machine the bodies of the space-type only) when formed by the machine will be varied from the normal in such degree that when all the type are assembled they will exactly fill the line, or in other words, will produce a justified line, while corresponding perforations in both of the strips will operate to center one after another the several dies corresponding to the types which those perforations respectively designate, and set in action the type-forming mechanism, as well as the mechanism for assembling the completed type in lines and arranging the lines in a galley or form.

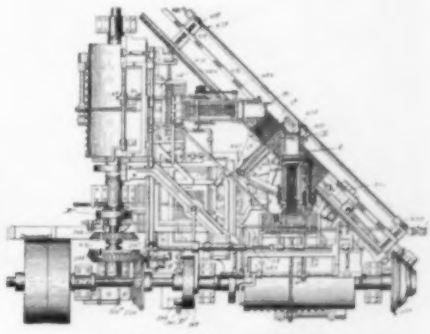
In this machine the dies or matrices are all arranged in a case that is controlled by two frames that slide at right angles to each other, so as to bring any particular die to a common centering-point, according to the amount of movement given said sliding frame respectively, the sliding frames themselves in turn being operated from movable pin-carriages that are provided with pins which, when protected, are adapted to coöperate with corresponding cam-grooves in certain rotary cam-cylinders. The projection of these pins into their corresponding cam-grooves in the cam-cylinders is effected through suitable intermediate mechanism controlled by the perforations in the paper record-strips. To illustrate this, let it be supposed that the matrix-die for the formation of the letter "A" is to be brought to the centering-point. In this instance the perforations representing the letter "A" in the two record-strips will, through the mechanism controlled by said perforations, project the corresponding pins of the two carriages on the right and left hand side of the machine into the rotary cam-cylinder, and the rotation of said cylinders will cause the pins and their carriages and the connected sliding frames to shift the die-case and bring the die A to the centering-point.

When the desired die has been brought to the centering-point, a plunger located above the die-case at said point is automatically depressed, so as to move down the centered die from out of the die-case to form the top of one of a series of molds in a rotating mold-wheel located beneath the die-case in which the type is to be formed, and after the die has thus been brought into coöperation with the said mold a nozzle leading from a reservoir of hot type-metal is automatically inserted in the bottom of the mold, and by automatic pumping mechanism hot metal is forced into the mold to form the type, after which the die-depressing plunger and the pump-nozzle and the die-centering devices resume their normal positions. The mold, with the type within it, is rotated through a portion of the circle, so as to bring a new mold into position at the centering-point and so



THE ELEVATION

of the end of the right-hand side of the Monotype machine.



THE PLAN VIEW

of the Monotype, showing the centering levers by which the type is "justified."

The companion machine, the Linotype, was described by its inventor in the Classic Invention in the SCIENCE NEWS LETTER for December 3, 1932.

as to enable the formed type to be ejected into a trough or guide, where it remains until the types for the whole of the proposed line have been brought, one after another, into said trough or guide behind it, when the whole line is by certain automatic appliances swept or slid into a galley prepared for its reception, the galley in turn being automatically advanced after the reception of each line of type. . . .

Science News Letter, February 11, 1933

SEISMOLOGY

Sea Bottom North of Japan Shaken by Third Earthquake

FOF the third time in a few months, the sea bottom near the island of Sakhalin, north of Japan, was shaken by a deep-seated earthquake, on last Friday afternoon, Feb. 3, at 5:10.7 p. m., eastern standard time. The location of the quake was calculated by scientists of the U. S. Coast and Geodetic Survey and of the Jesuit Seismological Association on the basis of data supplied to Science Service by Georgetown and St. Louis Universities.

Science News Letter, February 11, 1933

Cellophane greenhouses are something new for gardeners.

Medieval descriptions of the romantic triad of elements

ARSENIC
ANTIMONY
BISMUTH

will make the next Classic of Science

PHYSICS

Einstein Develops Quantum Mechanics In Latest Paper

By DR. R. M. LANGER, California Institute of Technology, Science Service Correspondent.

PROF. ALBERT EINSTEIN'S first paper on the new quantum mechanics is soon to appear under the title: "Semivectors and Spinors."

He has just allowed his colleagues in theoretical physics at the California Institute of Technology at Pasadena, Calif., to have an advance view of some of the ideas contained in this forthcoming paper, which will be published in the *Proceedings of the Prussian Academy* at Berlin, with Dr. Walter Mayer as collaborating author.

Prof. Einstein is careful to explain that most of the results had already been discovered by other workers. But he wrote the forthcoming paper at the request of his friend, Prof. Paul Ehrenfest of Leiden, to clarify this little known subject.

His discussion with the theoretical physicists was, of course, technical. To make it easier for his American listeners Einstein spoke English. This is the first extended discussion he has delivered in English. Usually he chooses to use German in order to express himself more precisely and clearly. His English is, however, quite good.

Semivectors are related to vectors in somewhat the way that imaginary numbers are related to real numbers. The spinors are restricted semivectors. The vector concept is fundamental in relativity because it enables one to avoid irrelevancies. Thus it helps discover new laws.

The semivector may suggest new physical laws also for it has the same simplifying properties as the vector. As in the case of the vector, the semivector can furnish tensors. The famous equations of Lorentz can be written for semivectors but no important change is involved. The Dirac equation for an electron can be derived in an elegant manner but Prof. Einstein pointed out that it was not the simplest case of its type.

He said it would be interesting to study the simplest case. Then he went on to say that semivectors could be used to advantage in generalized relativity, but that unlike vectors they led to complicated equations.

When Prof. Richard C. Tolman, of the California Institute of Technology, asked for a physical description of a semivector, Prof. Einstein confessed he had been unable to think of any geometrical or physical picture but added that with mathematical analysis the subject could be handled with great ease.

Science News Letter, February 11, 1933

ANTHROPOLOGY

Chinless Skeleton Puzzles Scientists

AT LEAST one of Palestine's earliest known cave men had no chin. A cabled report to Dr. George Grant MacCurdy of Yale University, from Palestine, where archaeologists are excavating remains of ancient man, springs this new surprise regarding Palestine's inhabitants of the Old Stone Age.

A skeleton found in the Cave of the Oven, near Mt. Carmel, has been removed from its stone matrix. Instead of having the well-developed chin that has been ascribed to early Palestine cave men, this skeleton reveals the receding, chinless jaw typical of men of that time in Europe.

The report is from Miss Dorothy Garrod, of the expedition of the American School of Prehistoric Research and the British School of Archaeology.

Altogether, ten skeletons of Palestine men have been unearthed in caves near

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Mt. Carmel in the past year by the expedition. The type has been judged so different from contemporary Neandertal race of European countries that Sir Arthur Keith, British anthropologist, called it a new race of man, and suggested the name *Paleoanthropus palestinus*, or the Old Man of Palestine.

The new development in the situation may mean one of two things, Dr. MacCurdy said:

First, that the Neandertal race at a given time and place was subject to a greater physical variation than has been supposed.

Second, that the nine skeletons discovered last year by Theodore McCown of the expedition will be found, when they are completely detached from their stony matrix, to have chins that are more receding than their appearance, partly obscured as yet, has indicated.

It will be some time before all the evidence is available, Dr. MacCurdy commented, but it may be assumed that all ten will find a place in the species hitherto known as *Homo neandertalensis*.

Science News Letter, February 11, 1933

ELECTRICITY

Yellow Sodium Light Effective Outdoors

See Front Cover

A COMMERCIAL application has been found for the extremely efficient sodium vapor lamp. A highway in Holland is now illuminated with these light units giving off an intense yellow glow; and this light, that makes color discrimination impossible and is devastating to Milady's make-up, is said to be specially desirable for outdoor illumination. The monochromatic character of the light apparently assists vision at the low intensities which prevail out of doors.

While this application is being pushed, sodium lamps will also prove more valuable in chemical laboratories where monochromatic light is required for analytical work, Ward Harrison, director of engineering at Nela Park, Cleveland, General Electric Lamp headquarters, believes.

The front cover pictures a sodium vapor lamp set up for test in a spherical photometer.

Mr. Harrison, writing in *Electrical World*, said that it does not appear that the efficiency of sodium lamps will offset their inherent high cost except in sizes of 100 watts or more.

Science News Letter, February 11, 1933

ECONOMICS-ENGINEERING

No Stocks, Bonds Or Debts Under Rule of Technologists

Abolition of "Absentee Ownership" Would Usher in New Order of Society, Pioneer Veblen Thought

This is the third article of a series presented to illuminate the backgrounds and objectives of the movement that has found expression in the discussion of Technocracy. The material is given as information and news, not as our opinion or with our endorsement. The next article will describe the practical steps toward rule by Technocracy, as proposed by Veblen.

THE "DISALLOWANCE of absentee ownership" is the key action that would usher in the rule by technology that was outlined by Thorstein Veblen, economist, in his 1919 memorandum on a "soviet of technicians." Some see in his suggestions a plan for the eventual control of the nation by "technocrats."

In its elements, Veblen contended, the "revolutionary overturn" of the established order will be of the simplest and most matter-of-fact character, although there will doubtless be many intricate adjustments to be made in detail.

From the abolition of absentee ownership, which Veblen called "an institution which has, in the course of time and change, proved to be noxious to the common good," the rest of the new industrial order would follow.

Mines, railroads, land, natural resources in general, factories, stocks, bonds, banks, stores, manufactured goods, etc. would revert to the ownership of the technology-ruled community under the Veblen plan. Veblen wrote:

Absentee Ownership Defined

"By absentee ownership is here to be understood the ownership of an industrially useful article by a person or persons who are not habitually employed in the industrial use of it. In this connection, office work of a commercial nature is not rated as industrial employment.

"A corollary of some breadth follows immediately, although it is so obvious an implication of the main proposition that it should scarcely need explicit statement: An owner who is employed in the industrial use of a given parcel of property owned by him, will still be an 'absentee owner,' within the meaning of the term, in case he is not the only person habitually employed in its use.

"A further corollary follows, perhaps less obvious at first sight, but no less convincing on closer attention to the sense of the terms employed: Collective ownership, of the corporate form, that is to say ownership by a collectivity instituted ad hoc, also falls away as being unavoidably absentee ownership, within the meaning of the term. It will be noted that all this does not touch joint ownership of property held in undivided interest by a household group and made use of by the members of the household conjointly. It is only in so far as the household is possessed of useful property not made use of by its members, or not made use of without hired help, that its ownership of such property falls within the meaning of the term, absentee ownership.

Private Wealh Doomed

"To be sufficiently explicit, it may be added that the cancelment of absentee ownership as here understood will apply indiscriminately to all industrially useful objects, whether realty or personalty, whether natural resources, equipment, banking capital, or wrought goods in stock."

An immediate consequence of the abolition of absentee ownership seen by Veblen is that industrially useful articles would cease to be used for purposes of private gain. The inducement to private accumulation of wealth at the cost of the community would virtually fall away. Legally the disallowance of absentee ownership would take the form of the cancellation of all corporation securities, articles of partnership, evidences of debt and other legal instruments which now give title to property not in hand and not in use by the owner.

Veblen realized that this might be called subversive and revolutionary but he pointed out that "all of it would neither subvert nor derange any sub-

stantial mechanical contrivance or relation, nor need it materially disturb the relations, either as workman or as consumer of goods and services, of any appreciable number of persons now engaged in productive industry. In fact, the disallowance will touch nothing more substantial than a legal make-believe. This would, of course, be serious enough in its consequences to those classes—called the kept classes—whose livelihood hangs on the maintenance of this legal make-believe. So, likewise, it would vacate the occupation of the 'middleman,' which likewise turns on the maintenance of this legal make-believe; which gives 'title' to that to which one stands in no material relation."

Absentee ownership, whose abolition would be necessary to usher in rule by technology, is "the idol of every true American heart." So wrote Veblen.

For this and other reasons, Veblen was not sanguine as to the possibilities of putting his plan into operation.

"The economic-moral sense of the American community today," he wrote, "runs unequivocally to the effect that absentee ownership is fundamentally and eternally right and good; and it should seem reasonable to believe that it will continue to run to that effect for some time yet."

Absentee Owners Revered

"The most tenacious factor in any civilization is a settled popular frame of mind, and to this abiding American frame of mind absentee ownership is the controlling center of all the economic realities."

Regarding absentee ownership, Veblen wrote:

"It is the substance of things hoped for and the reality of things not seen. To achieve (or to inherit) a competency, that is to say to accumulate such wealth as will assure a 'decent' livelihood in industrial absentia, is the universal, and universally laudable, ambition of all who have reached years of discretion; but it all means the same thing—to get something for nothing, at any cost. Similarly universal is the awestruck deference with which the larger absentee owners are looked up to for guidance and example. These substantial citizens are the ones who have 'made good,' in the popular apprehension. They are the great and good men whose lives 'all remind us we can make our lives sublime, etc.'"

Veblen realized that a proposal to disallow absentee ownership will shock the moral sensibilities of many persons, particularly the absentee owners. He therefore mentioned the "moral aspect," admitting that absentee ownership is legally sound today with the Constitution including a clause that safeguards its security. If and when the law is changed in this respect, he remarked, what is so legal today will of course cease to be legal.

Another reason why there need be no present fear of a revolutionary overturn was stressed by Veblen.

"Safe" Business Men

"By settled habit," he said, "the American population are quite unable to see their way to entrust any appreciable responsibility to any other than business men; at the same time that such a move of overturn can hope to succeed only if it excludes the business men from all positions of responsibility. This sentimental deference of the American people to the sagacity of its business men is massive, profound, and alert. So much so that it will take harsh and protracted experience to remove it, or to divert it sufficiently for the purpose of any revolutionary diversion. And more particularly, popular sentiment in this country will not tolerate the assumption of responsibility by the technicians, who are in the popular apprehension conceived to be a somewhat fantastic brotherhood of over-specialized cranks, not to be trusted out of sight except under the restraining hand of safe and sane business men. Nor are the technicians themselves in the habit of taking a greatly different view of their own case. They still feel themselves, in the nature of things, to fall into place as employees of those enterprising business men who are, in the nature of things, elected to get something for nothing. Absentee ownership is secure, just yet. In time, with sufficient provocation, this popular frame of mind may change, of course; but it is in any case a matter of an appreciable lapse of time."

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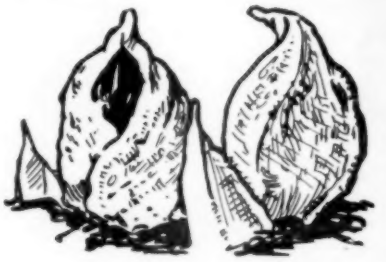
Most glass made today has the same chemical composition as glass made in the Middle Ages.

Government agents who have been eradicating current and gooseberry bushes in northeastern states, to fight white pine blister rust, found several bushes growing in trees at such height that extension ladders were required to reach them.

BOTANY

NATURE RAMBLINGS
by Frank Thone



Spring's Uncouth Messenger

HARDIEST harbinger of spring, the skunk cabbage is at this moment probing its way up through the frozen soil, and even cracking thin ice on swamps, all over the East and throughout most of the Mississippi valley. Despised and rejected of all mankind, it does not deserve its fate. Rather we should hail it—from a distance, perhaps, if our noses are too nice—as the eldest and boldest of the children of the sun.

For this skunk cabbage is the first spring flower. When Johnny-Jump-Up and Spring Beauty and Jack-in-the-Pulpit are still shivering in their beds, hating the very notion of getting up at all, this burly little rough-neck is pushing his purple nose out into the cold pre-dawn of Spring, and offering his blossom, such as it is, before a too-fastidious world.

This great precociousness on the part of skunk cabbage is made possible by his food hoard from the preceding summer. Like most vernal-flowering plants, he has a thick and fleshy rootstock, stored with starch, which supplies the energy and material needed for the growth he makes during a season when the sun gives scanty encouragement and the frozen earth even less. This precociousness also makes it possible for the skunk cabbage to produce blossoms and have the important business of making seed well under way before other plants even started.

Worth noting is the fact that neither the flower nor the later-coming leaves will offend the nose if they are not broken or bruised—like his animal namesake, the skunk cabbage withholds his sachet for defensive purposes only.

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First Glances at New Books

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Linguistics

LANGUAGE AND LANGUAGES—Willem L. Graff—*Appleton,* 487 p., $4. This is a general introduction to linguistics, designed to reveal the fundamental concepts and organization of the science of language to the beginning student and general reader. It deals with language in its general significance as the primary means of human communication and does not treat any particular language or group of languages.

Science News Letter, February 11, 1933

Physics

WAVE MECHANICS: ELEMENTARY THEORY—J. Frenkel—*Oxford,* 278 p., $5. A competent and authoritative treatment of the elementary theory of wave mechanics written while the author, who is professor at the Physico-Technical Institute, Leningrad, was lecturing on the subject at the University of Minnesota. It is the first of a trilogy of volumes. Its six chapters are headed: Light, Matter, Wave Mechanics of the Motion of a Particle in a Field of Force, Wave Mechanics of a System of Particles, Statistical Mechanics, Application of the Quantum Statistics to the Electron Theory of Metals, Heat Motion, and Radiation. It thus covers the entire field of wave mechanics and the new quantum statistics connected with it.

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Mechanical Engineering

FORGING—John Lord Bacon., revised by Carl Gunnard Johnson—*American Technical Society,* 110 p., $1.25. Hand forging of wrought iron and steel, drop forging and heat treatment of steel are covered in this practical treatise.

Science News Letter, February 11, 1933

Electrical Engineering

STORAGE BATTERIES—Francis B. Crocker, Morton Arendt and Ray F. Kuns—*American Technical Society,* 83 p., $1.50. A practical handbook of useful facts and principles of lead and non-lead batteries.

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Physics

AN INTRODUCTION TO PHYSICAL SCIENCE—Carl W. Miller—*John Wiley,* 403 p., $3. A new text designed for a single year survey course and written by the associate professor of physics in Brown University. Says the author: "The contacts which physics makes with all other sciences and with the paraphernalia of everyday life make it more than ever before a *sine qua non* of a well-rounded education, and this primary function is not performed if the instruction must stop at the threshold of the newer developments."

Science News Letter, February 11, 1933

General Science-Literature

ESSAYS IN SCIENCE AND ENGINEERING—Compiled by Franz Montgomery—*Long & Smith,* 616 p., $2. To aid in the teaching of English to scientific and engineering students (a great need to most of them) the instructor in engineering English at the University of Minnesota, has brought together essays worthy in style and content. The selections reprinted "explode the myth that science and literature are immiscible.

Science News Letter, February 11, 1933

Engineering

A PLANNING MANUAL FOR COUNTY HIGHWAY IMPROVEMENT, *National County Roads Planning Commission,* 88 p., free. Even the county road building should be done according to as scientific a plan as that followed by the state or nation. This manual tells how to plan for a wealthy, thickly populated urban community such as Morris County, N. J., suburban to New York City or for isolated, sparsely settled and relatively poor rural communities such as Prince William county, Va., comprehensive studies having been made in both counties before the preparation of the manual.

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Public Health

THE SANITATION OF WATER SUPPLIES—Murray P. Horwood—*Thomas,* 181 p., $3. Designed as a text for students in municipal sanitation and public health, this book contains considerable material of general interest. The layman who takes an intelligent if unprofessional interest in such matters and wants to know the background of the water in his drinking glass will find it well worth reading.

Science News Letter, February 11, 1933

Radio-Education

EDUCATIONAL BROADCASTING—Robert Lingel—*University of Chicago Press,* 162 p., $1.50. A bibliography compiled for the National Advisory Council on Radio in Education.

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Physics

WORKBOOK IN PHYSICS—Samuel Ralph Powers and H. Emmett Brown—*Allyn and Bacon,* 294 p., 80c. Designed to be used with any of the standard textbooks in high school physics, there are a hundred exercises which require that the student complete statements in the familiar psychological test manner. This, say the authors, results in the association of related concepts and the outcome is "an identifiable element of learning stated in concise declarative sentences."

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Radio-Physics

THE RADIO ENGINEERING HANDBOOK—edited by Keith Henney—*McGraw-Hill,* 585 p., $5. To take its place alongside the time-honored engineering handbooks used by civil, mechanical, electrical and other varieties of engineers, this volume has been compiled with the aid of twenty odd engineers and physicists. It is an evidence that radio has at last begun to end its adolescence.

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Physics

PRACTICAL ELECTRICITY—Terrell Croft—*McGraw-Hill,* 674 p., $3. This third edition of a successful book contains a new section on vacuum tubes while the section on matter and the electron theory has been revised.

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Physics

ELEMENTARY INDUSTRIAL ELECTRICITY—L. Raymond Smith—*McGraw-Hill,* 287 p., $2. The second edition of a textbook in the series published under the general title of Industrial Physics. Its first edition was under the title Direct-Current Electricity.

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Mathematics

ARITHMETIC FOR TEACHERS—Harriet E. Glazier—*McGraw-Hill,* 291 p., $2. While its title implies an exclusive audience, this book will undoubtedly interest many not teaching and beyond the reach of the teacher who wish to see what they missed in high school and college.

Science News Letter, February 11, 1933

General Science

REPORT OF THE UNITED STATES NATIONAL MUSEUM, 1932—*Government Printing Office,* 181 p., 25c.

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• First Glances at New Books

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Engineering

THE QUEST FOR POWER—Hugh P. and Margaret W. Vowles—*Chapman and Hall, London,* 354 p., 15s. After reading this book one might well say that the so-called "technocracy" was conceived when prehistoric man first fashioned tools from stone, so well does it tell the story of the coming of the machine age from the very beginning and describe its present state. For the intelligent general reader this well illustrated volume will be entertaining and informative and will well background any thoughts on proposed changes in the economic order suggested by the influence of technological development of civilization.

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Science-Philosophy

MAN COMES OF AGE—John Langdon-Davies—*Harper,* 265 p., $3.50. The author of "Man and His Universe" answers the average man's question, "How does modern science influence my morals, my conduct, my happiness?". The two parts of the book are titled: The World of Reality and the World of Make-Believe.

Science News Letter, February 11, 1933

Physics-General Science

WHERE IS SCIENCE GOING?—Max Planck—*Norton,* 221 p., $2.75. Interesting physics and philosophy by the originator of the quantum theory, and one of the makers of modern physics. Such questions as the reality of the external world, causation and free will, the difference between reversible and irreversible processes are considered. There is a prologue by Prof. Albert Einstein and a Socratic epilogue between Planck, Einstein and James Murphy, Planck's biographer.

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Chemistry

THE CATALYTIC OXIDATION OF ORGANIC COMPOUNDS IN THE VAPOR PHASE—L. F. Marek and Dorothy A. Hahn—*Chemical Catalogue,* 486 p., $9. Says the preface of this American Chemical Society monograph: "Although oxidation is one of the commonest reactions known and is widely used as a source of energy, it is only within the past fifty or sixty decades that concerted efforts have been made to study individual reactions systematically and to apply them in the formulation of useful processes. It is only natural that the effect of catalysts should have received early attention, and it is worthy of note that some of the earliest observations of catalytic effects had to do with oxidation reactions. In some cases development has been rapid and industrial processes have been worked out; in other cases, troublesome obstacles have been encountered and development delayed." Facts regarding both developed and undeveloped processes are reviewed critically.

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Psychology-Philosophy

MIND AND MATTER—G. F. Stout—*Macmillan,* 325 p., $3.75. The professor of logic and metaphysics in the University of St. Andrews examines the aspects of ordinary experience, those involved in the knowledge of the physical world, of the self and of minds other than our own. The contents are in three general divisions under the headings: The Animism of Common Sense, The Psycho-Physical Problem and Knowledge of Physical Existence.

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Health-Psychology

WHY WE DO IT—Arthur R. Daviau—*Meador,* 231 p., $2. A discussion of facts and theories about welfare work, health and heredity, sleep, and life in general, written by the health officer of a city of 15,000 population.

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General Science

AND THAT'S WHY . . . —W. Maxwell Reed—*Harcourt, Brace,* 104 p., $1.25. Why clouds are in the sky, why lightning flashes, why lamps shine, are a few of the endless whys of small children answered connectedly and understandably to young minds, so as to make a palatable and painless beginning for the study of what will later on be the physical sciences. Decidedly a book to be recommended for children who really want to know.

Science News Letter, February 11, 1933

Aeronautics

HEROES OF THE AIR—Chelsea Fraser—*Thomas Y. Crowell,* 672 p., $2.50. The revised edition of a readable record of the achievements of aviation.

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Geology

EARTH HISTORY—Luther C. Snider—*Century,* 683 p., $4.50. It is unfortunate that more books having the particular merits possessed by this one are not written, for the production of such writing as this is truly the best way to spread knowledge of science. One of Century's Earth Science Series, this volume fully bears out the announcement of the publishers in being authoritative, scholarly, clear, concise and readable. Illustrations are abundant and are better than those usually found in geology texts.

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Radio-Education

RADIO AND EDUCATION 193[illegible] Edited by Levering Tyson—*University of Chicago Press,* 306 p., $3. The contemporary aspects of the place of radio in education both in schools and in the field known as "adult education" is summarized by these proceedings of the second assembly of the National Advisory Council on Radio in Education.

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Astronomy-Archaeology

THE SOLAR YEAR OF THE MAYAS AT QUIRIGUA, GUATEMALA—J. Eric Thompson—*Field Museum of Natural History,* 56 p., 35c. Here are traced progressive changes in the calendar system of the Mayas as shown in inscriptions at a single city. Improving in their efforts to keep step with the sun year, astronomers at Quirigua advanced from a 24-day a century correction to the approximately Gregorian reckoning, and at one time their calculations were mutually superior to Gregorian.

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Zoology

FURTHER STUDIES ON THE FAUNA OF NORTH AMERICAN HOT SPRINGS—Charles T. Brues—*Am. Acad. Arts and Sciences,* 118 p., $1.85. Published originally in the Proceedings of the American Academy of Arts and Sciences, this study adds substantially to Prof. Brues' earlier data on the inhabitants of hot springs, mostly in Yellowstone National Park.

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